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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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GENERAL ELECTRIC COMPANY (PCPI)
C/O FLETCHER YODER
P. O. BOX 692289
HOUSTON, TX 77269-2289

EXAMINER	
SHARON, AYAL I	

ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/683,696	REBELLO ET AL.	
	Examiner	Art Unit	
	Ayal I. Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-13,15-19,22-33 and 35-42* is/are rejected.

7)☒ Claim(s) *8,14,20-21, and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/15/02, 11/24/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-42 of U.S. Application 09/683,696 filed on 02/05/2002 are presented for examination.

Claim Objections

2. Claim 13 is objected to because of the following informalities: the word "reated" should be spelled "**c**reated". Appropriate correction is required.

Allowable Subject Matter

3. Claims 8, 14, 20-21 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and all intervening claims.
4. The following is a statement of reasons for the indication of allowable subject matter.
5. In regards to Claim 8, neither Sebastian nor Pang, either individually or in combination, expressly teach the claim in its entirety, in combination with the limitations of the parent claims:

> *8. The method of claim 7, wherein said generation of the non-parametric CAD model for the part comprises:*
>
> *reducing the data to obtain a subset of the data,*

segmenting the subset to obtain a plurality of feature subsets of the data, each feature subset corresponding to a feature of the part,

performing geometric feature extraction to obtain a plurality of curves and surfaces from the feature subsets, the curves and surfaces characterizing the features of the part, and

importing the curves and surfaces into a computer aided design (CAD) geometry to obtain the non-parametric CAD model.

6. In regards to Claim 14, neither Sebastian nor Pang, either individually or in combination, expressly teach the claim in its entirety, in combination with the limitations of the parent claims:

14. The method of claim 12, further comprising preparing the design analysis context model for performance of the analysis, said preparation comprising:

meshing the design analysis context model using the analysis code guidelines to obtain a meshed design model, and

mapping a plurality of boundary conditions onto the meshed design model using the analysis code guidelines to obtain a design analysis model, the method further comprising:

performing the engineering analysis on the design analysis model to obtain a plurality of engineering analysis data, said performance comprising executing an engineering analysis code using the design analysis model and a plurality of convergence criteria; and

evaluating the engineering analysis data and, if the engineering analysis data are unsatisfactory, said method still further comprising:

modifying the parametric master model using a plurality of redesign goals, and repeating said performance of the engineering analysis after modifying the parametric master model.

7. In regards to Claim 20, neither Sebastian nor Pang, either individually or in combination, expressly teach the claim in its entirety, in combination with the limitations of the parent claims:

> *20. The method of claim 19, wherein at least two tooling context models are created, each of the tooling context models being configured for performing a different manufacturing process analysis.*

8. In regards to Claim 21, neither Sebastian nor Pang, either individually or in combination, expressly teach the claim in its entirety, in combination with the limitations of the parent claims:

> *21. The method of claim 19, further comprising preparing the tooling context model for performance of the manufacturing process analysis, said preparation comprising:*
>
> *meshing the tooling context model using the analysis code guidelines to obtain a meshed tooling model, and*
>
> *mapping a plurality of boundary conditions onto the meshed tooling model using the analysis code guidelines to obtain a tooling analysis model, said method further comprising performing the manufacturing process analysis on the tooling analysis model to obtain tooling analysis data,*
>
> *said performance comprising executing a manufacturing process analysis code using the tooling analysis model, a plurality of convergence criteria, and a plurality of process parameters; and*
>
> *evaluating the tooling analysis data and, if the tooling analysis data are unsatisfactory, still further comprising:*
>
> *modifying the tooling master model using a plurality of manufacturing goals tooling design tradeoffs, and*
>
> *repeating said performance of the manufacturing process analysis after modifying the tooling master model.*

9. In regards to Claim 34, neither Sebastian nor Pang, either individually or in combination, expressly teach the claim in its entirety, in combination with the limitations of the parent claims:

> *34. The system of claim 33, wherein said tooling master model module further comprises a tooling part data management (PDM) system configured to store a plurality of operating condition data for deriving a plurality of boundary conditions and a plurality of process parameters,*
>
> *wherein said tooling linked model environment is configured to link said tooling PDM system:*
>
> *to a meshed tooling model obtained from the tooling context model, to map the boundary conditions onto the meshed tooling model, and*
>
> *to the manufacturing process analysis to supply the process parameters for performing the manufacturing process analysis.*

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

    A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

    Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 24 and 30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 9 of U.S.

Patent No. 6,856,842. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

a. The following are limitations of claims 24 and 30 in the instant application:

> **Instant Application Claim 24:** A system for re-engineering a part comprising:
>
> a part design master model module configured to generate a parametric master model for the part from an editable geometry for the part; and
>
> a tooling master model module configured to receive the parametric master model, to generate a manufacturing context model from the parametric master model, and to create a tooling master model from the manufacturing context model,
>
> wherein the manufacturing context model comprises a plurality of tooling features and the tooling master model comprises a tooling geometry.
>
> ---
>
> **Instant Application Claim 30:** The system of claim 24, wherein said tooling master model module comprises:
>
> a tooling computer aided design (CAD) system configured to receive the parametric master model, to orient the parametric master model after processing with a plurality of geometric dimensions and tolerances to obtain an oriented GD&T model, and to generate the manufacturing context model from the parametric master model; and
>
> a tooling knowledge based environment configured to apply a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model.

b. The following are limitations of claim 9 in the issued patent:

> **Issued Patent Claim 9:** A system for generating a tooling master model for a manufacturing process for a part, the tooling master model comprising a tooling geometry and the manufacturing

process comprising at least one manufacturing step, said system comprising:

a computer aided design (CAD) system configured to receive a parametric model and to generate a manufacturing context model from the parametric model, the manufacturing context model comprising a plurality of tooling features,

wherein said CAD system is further configured to orient the parametric model after processing with a plurality of geometric dimensions and tolerances to obtain an oriented GD&T model, and

wherein said CAD system is further configured to process the parametric model with a plurality of producibility data to add the acometric dimensions and tolerances to the parametric model; and

a knowledge based environment configured to apply a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step.

c. Examiner finds that claim 30 in the instant application corresponds to claim 9 in the issued patent.

The difference between the claims is that in claim 30, "a part design master model module" generates the "parametric ... model", while in claim 9 the "parametric model" is "received". No mention is made of how it was generated. Examiner finds that it would have been obvious to one of ordinary skill in the art at the time that the invention was made that:

(1) the "parametric model" needs to be generated somehow, and

(2) in light of the specification of the instant application, it would be obvious to generate the "parametric model" from "a master model module".

Therefore, claim 9 in the issued patent reads on claim 30 in the instant application, as well as on the broader parent claim 24.

12. Claim 36 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 15 of U.S. Patent No. 6,856,842. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

a. The following are limitations of claim 36 in the instant application:

> **Instant Application Claim 36:** A method of manufacturing comprising:
>
> generating a parametric master model for a part from an editable geometry for the part;
>
> generating a manufacturing context model from the parametric master model, the manufacturing context model comprising a plurality of tooling features;
>
> creating a tooling master model from the manufacturing context model, the tooling master model comprising a tooling geometry for the part;
>
> generating a hard tooling using the tooling master model; and
>
> manufacturing at least one part using the hard tooling and a plurality of process parameters.

b. The following are limitations of claim 15 in the issued patent:

> **Issued Patent Claim 15:** A method of manufacturing comprising:
>
> generating a manufacturing context model for a manufacturing process for a part from a parametric model, the manufacturing context model comprising a plurality of tooling features and the manufacturing process comprising at least one manufacturing step;

creating a tooling master model from the manufacturing context model, the tooling master model comprising a tooling geometry for the part;

generating a hard tooling using the tooling master model; and

manufacturing at least one part using the hard tooling and a plurality of process parameters, wherein said generation of the manufacturing context model comprises:

orienting the parametric model with a plurality aco-metric dimensions and tolerances to obtain an oriented GD&T model, and

applying a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step, wherein the manufacturing design rules comprise a plurality of tooling design rules.

c. Claim 15 in the issued patent is narrower in scope than claim 36 in the instant application, because claim 15 in the issued patent contains the following limitations that are absent from claim 36 in the instant application:

wherein said generation of the manufacturing context model comprises:

orienting the parametric model with a plurality aco-metric dimensions and tolerances to obtain an oriented GD&T model, and

applying a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model for the manufacturing step, wherein the manufacturing design rules comprise a plurality of tooling design rules.

Therefore, the narrower claim in the issued patent reads on the broader claim in the instant application.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. The prior art used for these rejections is as follows:

15. Sebastian, U.S. Patent 5,822,206. (Henceforth referred to as "**Sebastian**").

16. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

17. Claims 1-3, 5-7, 9-13, 15-19, 22-33, and 35-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Sebastian.

18. In regards to Claim 1, Sebastian teaches the following limitations:

1. A method of re-engineering a part comprising:

generating a parametric master model for the part from an editable geometry for the part;

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Detailed Part Design" (Fig.1, Item 8) corresponds to the claimed "parametric master model".

generating a manufacturing context model from a design master model, the design master model comprising the parametric master model and the manufacturing context model comprising a plurality of tooling features; and

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Prototype Tool Design" (Fig.1, Item 12) corresponds to the claimed "manufacturing context model".

creating a tooling master model from the manufacturing context model, the tooling master model comprising a tooling geometry for the part.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Tool Fabrication" (Fig.1, Item 14) corresponds to the claimed "tooling master model".

19. In regards to Claim 2, Sebastian teaches the following limitations:

2. The method of claim 1 further comprising: obtaining data characterizing the part; and generating the editable geometry for the part from the data.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Preliminary Part Design" "Approval", and "Detailed Parts Design" steps (Fig.1, Items 4, 6, and 8) corresponds to the claimed "obtaining data" and "generating editable geometry".

20. In regards to Claim 3, Sebastian teaches the following limitations:

3. The method of claim 2, wherein said obtaining comprises measuring the part to obtain the data.

See Sebastian's "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

21. In regards to Claim 5, Sebastian teaches the following limitations:

5. The method of claim 2, wherein the data comprise geometric data for the part.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the use of geometric data is inherent in the use of CAD and FEM software in the "Detailed Parts Design" steps (Fig.1, Item 8).

22. In regards to Claim 6, Sebastian teaches the following limitations:

6. The method of claim 5, wherein the data further comprise attribute data for the part.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the use of attribute data is inherent in the use of CAD and FEM software in the "Detailed Parts Design" steps (Fig.1, Item 8).

23. In regards to Claim 7, Sebastian teaches the following limitations:

> *7. The method of claim 5, wherein said generation of the editable geometry for the part comprises:*
>
> *generating a non-parametric computer aided design (CAD) model for the part from the geometric data; and*
>
> *reconstructing the non-parametric CAD model to obtain the editable geometry, said reconstruction comprising performing reverse CAD modeling.*

The specification of the instant application defines "reverse modeling" as follows (see paragraph [0003] in the PG-PUB):

> In these circumstances, replacement of the worn parts typically requires reverse engineering the part from an available physical specimen, which attempts to make a close copy of the part.

Sebastian teaches the measurement of a finished item and using it to update a CAD design in "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

24. In regards to Claim 9, Sebastian teaches the following limitations:

> *9. The method of claim 1, further comprising obtaining the editable geometry from legacy design information.*

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Preliminary Part Design" "Approval", and "Detailed Parts Design" steps (Fig.1, Items 4, 6, and 8) corresponds to the claimed "editable geometry" and "legacy design information".

25. In regards to Claim 10, Sebastian teaches the following limitations:

> *10. The method of claim 1, wherein said generation of the parametric master model comprises identifying and extracting a plurality of critical parameters from the editable geometry.*

(See Sebastian, especially: col.3, lines 12-20)

26. In regards to Claim 11, Sebastian teaches the following limitations:

> *11. The method of claim 10, wherein said extraction of the critical parameters comprises: applying a plurality of knowledge based engineering (KBE) part design generative rules to the editable geometry to obtain the parametric master model, and applying a plurality of KBE part design checking rules to the parametric master model to ensure that the parametric master model satisfies a plurality of functional and manufacturability requirements.*
>
> (See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

27. In regards to Claim 12, Sebastian teaches the following limitations:

> *12. The method of claim 1, further comprising creating at least one design analysis context model, the design analysis context model comprising an associative copy of the parametric master model which is configured for performing an engineering analysis.*

Examiner finds that the "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18) correspond to the claimed "performing an engineering analysis".

28. In regards to Claim 13, Sebastian teaches the following limitations:

> *13. The method of claim 12, wherein at least two design context models are created, each of the design context models being configured for performing a different engineering analysis.*

Examiner finds this to be a mere duplication of the steps claimed in claim 12.

29. In regards to Claim 15, Sebastian teaches the following limitations:

> *15. The method of claim 1, further comprising processing the parametric master model with producibility data from a producibility database to add geometric dimensions and tolerances (GD&T) to the parametric master model, wherein the design master model comprises the parametric master model with geometric dimensions and tolerances.*

(See Sebastian, especially: col.8, line 49 to col.9, 40)

30. In regards to Claim 16, Sebastian teaches the following limitations:

> *16. The method of claim 15, wherein said generation of the manufacturing context model comprises: orienting the parametric master model using the geometric dimensions and tolerances to obtain an oriented GD&T model; and applying a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model.*

(See Sebastian, especially: col.8, line 49 to col.9, 40)

31. In regards to Claim 17, Sebastian teaches the following limitations:

> *17. The method of claim 16, wherein said generation of the manufacturing context model further comprises: orienting the manufacturing context model to obtain the oriented GD&T model; and applying the manufacturing design rules to the oriented GD&T model to generate the manufacturing context model encompassing at least one additional manufacturing step, wherein said orientation and application are performed for each of the additional manufacturing steps.*

Examiner finds this to be a mere duplication of the steps claimed in claim 16.

32. In regards to Claim 18, Sebastian teaches the following limitations:

> *18. The method of claim 16, wherein the manufacturing design rules include a plurality of tooling design rules and wherein said creation of the tooling master model comprises applying the tooling design rules to the manufacturing context model to obtain the tooling master model, wherein the tooling geometry is derived from the tooling features by said application of the design rules.*
>
> (See Sebastian, especially: col.8, line 49 to col.9, 40)

33. In regards to Claim 19, Sebastian teaches the following limitations:

> *19. The method of claim 16, further comprising creating at least one tooling context model comprising an associative copy of the tooling master model which is configured for performing a manufacturing process analysis.*

See Sebastian's "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

34. In regards to Claim 22, Sebastian teaches the following limitations:

> *22. The method of claim 16, further comprising adding a plurality of geometric dimensions and tolerances (GD&Ts) to tooling master model.*

(See Sebastian, especially: col.8, line 49 to col.9, 40)

35. In regards to Claim 23, Sebastian teaches the following limitations:

> *23. The method of claim 22, wherein the tooling master model further includes a plurality of process parameters, the method further comprising: generating a hard tooling using tooling master model with the geometric dimensions and tolerances; manufacturing at least one test part using the hard tooling and using the process parameters; inspecting test part to obtain measurement data;*
> *and assessing the measurement data to determine whether the test parts satisfy a plurality of engineering criteria for the part.*

See Sebastian's "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

36. In regards to Claim 24, Sebastian teaches the following limitations:

> *24. A system for re-engineering a part comprising:*
>
> *a part design master model module configured to generate a parametric master model for the part from an editable geometry for the part; and*

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Detailed Part Design" (Fig.1, Item 8) corresponds to the claimed "parametric master model".

> *a tooling master model module configured to receive the parametric master model, to generate a manufacturing context model from the parametric master model, and*

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Prototype Tool Design" (Fig.1, Item 12) corresponds to the claimed "manufacturing context model".

to create a tooling master model from the manufacturing context model, wherein the manufacturing context model comprises a plurality of tooling features and the tooling master model comprises a tooling geometry.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Tool Fabrication" (Fig.1, Item 14) corresponds to the claimed "tooling master model".

37. In regards to Claim 25, Sebastian teaches the following limitations:

25. The system of claim 24, wherein said part design master model module comprises: a computer aided design (CAD) system configured to generate the parametric master model from the editable geometry; and a knowledge based engineering (KBE) environment configured to apply a plurality of knowledge based engineering (KBE) part design generative rules to the editable geometry to obtain the parametric master model, and to apply a plurality of KBE part design checking rules to the parametric master model to ensure that the parametric master model satisfies a plurality of functional and manufacturability requirements.

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

38. In regards to Claim 26, Sebastian teaches the following limitations:

26. The system of claim 25, wherein said CAD system is further configured to generate the editable geometry from data characterizing the part.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Preliminary Part Design" "Approval", and "Detailed Parts Design" steps (Fig.1, Items 4, 6, and 8) corresponds to the claimed "obtaining data" and "generating editable geometry".

39. In regards to Claim 27, Sebastian teaches the following limitations:

27. The system of claim 25, wherein said part design master model module further comprises: a linked model environment configured for creating at least one design analysis context model, the context model comprising an associative copy of the parametric master model and being configured for performing an engineering analysis; and an engineering

analysis code for performing the engineering analysis to generate engineering analysis data for evaluating the parametric master model.

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

40. In regards to Claim 28, Sebastian teaches the following limitations:

28. The system of claim 27, wherein said part design master model module further comprises a part data management (PDM) system configured to store operating condition data for deriving a plurality of boundary conditions, wherein said linked model environment is configured to link said PDM system to a meshed design model obtained from the design analysis context model, to map the boundary conditions onto the meshed design model.

(See Sebastian, especially: Fig.6, Items 76a, 112, 102, and associated text)

41. In regards to Claim 29, Sebastian teaches the following limitations:

29. The system of claim 25, wherein said CAD system is further configured to process the parametric master model with producibility data to add geometric dimensions and tolerances to the parametric master model.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Preliminary Part Design" "Approval", and "Detailed Parts Design" steps (Fig.1, Items 4, 6, and 8) corresponds to the claimed "obtaining data" and "generating editable geometry".

See also Sebastian, especially: col.8, line 49 to col.9, 40.

42. In regards to Claim 30, Sebastian teaches the following limitations:

30. The system of claim 24, wherein said tooling master model module comprises: a tooling computer aided design (CAD) system configured to receive the parametric master model, to orient the parametric master model after processing with a plurality of geometric dimensions and tolerances to obtain an oriented GD&T model, and to generate the manufacturing context model from the parametric master model; and a tooling knowledge based environment configured to apply a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model.

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

43. In regards to Claim 31, Sebastian teaches the following limitations:

> *31. The system of claim 30, wherein said tooling CAD system is further configured to generate the manufacturing context model for a plurality of manufacturing steps.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

44. In regards to Claim 32, Sebastian teaches the following limitations:

> *32. The system of claim 30, wherein the manufacturing design rules include a plurality of tooling design rules, wherein said tooling knowledge based environment is further configured to apply the tooling design rules to the manufacturing context model, and wherein said tooling CAD system is further configured to derive the tooling geometry from the manufacturing context model using the tooling design rules, to generate the tooling master model.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

45. In regards to Claim 33, Sebastian teaches the following limitations:

> *33. The system of claim 32, wherein said tooling master model module further comprises: a tooling linked model environment configured for creating at least one tooling context model, wherein the tooling context model comprises an associative copy of the tooling master model and is configured for performing a manufacturing process analysis; and a manufacturing process analysis code for performing the manufacturing process analysis to generate tooling analysis data for evaluating the tooling master model.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

46. In regards to Claim 35, Sebastian teaches the following limitations:

> *35. The system of claim 33, wherein said tooling CAD system is further configured to add a plurality of geometric dimensions and tolerances (GD&Ts) to the tooling master model.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

47. In regards to Claim 36, Sebastian teaches the following limitations:

36. A method of manufacturing comprising:

generating a parametric master model for a part from an editable geometry for the part;

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Detailed Part Design" (Fig.1, Item 8) corresponds to the claimed "parametric master model".

generating a manufacturing context model from the parametric master model, the manufacturing context model comprising a plurality of tooling features;

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Prototype Tool Design" (Fig.1, Item 12) corresponds to the claimed "manufacturing context model".

creating a tooling master model from the manufacturing context model, the tooling master model comprising a tooling geometry for the part;

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Tool Fabrication" (Fig.1, Item 14) corresponds to the claimed "tooling master model".

generating a hard tooling using the tooling master model; and

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Tool Fabrication" (Fig.1, Item 14) corresponds to the claimed "generating a hard tooling".

manufacturing at least one part using the hard tooling and a plurality of process parameters.

(See Sebastian, especially: Fig.1, 3, and 6, and associated text)

Examiner finds that the "Tool Fabrication" following "Production Tool Design" (Fig.1, Item 24) corresponds to the claimed "manufactutring at least one part ...".

48. In regards to Claim 37, Sebastian teaches the following limitations:

> *37. The method of claim 36, further comprising generating the editable geometry from data characterizing the part.*

See Sebastian's "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

49. In regards to Claim 38, Sebastian teaches the following limitations:

> *38. The method of claim 36, wherein said generation of the parametric master model comprises: applying a plurality of knowledge based engineering (KBE) part design generative rules to the editable geometry to obtain the parametric master model, and applying a plurality of KBE part design checking rules to the parametric master model to ensure that the parametric master model satisfies a plurality of functional and manufacturability requirements, wherein said method further comprises creating at least one design analysis context model for evaluating the parametric master model, the design analysis context model comprising an associative copy of the parametric master model which is configured for performing an engineering analysis.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

50. In regards to Claim 39, Sebastian teaches the following limitations:

> *39. The method of claim 38, further comprising processing the parametric master model with producibility data from a producibility database to add geometric dimensions and tolerances (GD&T) to the parametric master model, wherein said generation of the manufacturing context model comprises: orienting the parametric master model using the geometric dimensions and tolerances to obtain an oriented GD&T model, and applying a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model, wherein the manufacturing design rules comprise a plurality of tooling design rules.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

51. In regards to Claim 40, Sebastian teaches the following limitations:

> *40. The method of claim 39, wherein the manufacturing context model is generated for a plurality of manufacturing steps.*

See Sebastian's "Prototype Tool Design", "Tool Fabrication", "Process Specification", and "Molding Trials" steps (Fig.1, Items 12, 14, 16 and 18).

52. In regards to Claim 41, Sebastian teaches the following limitations:

> *41. The method of claim 39, wherein said creation of the tooling master model comprises applying the tooling design rules to the manufacturing context model to obtain the tooling master model, wherein the tooling geometry is derived from the tooling features by said application of the design rules.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

53. In regards to Claim 42, Sebastian teaches the following limitations:

> *42. The method of claim 41, further comprising creating at least one tooling context model comprising an associative copy of the tooling master model which is configured for performing a manufacturing process analysis.*

(See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65)

Claim Rejections - 35 USC § 103

54. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

55. The prior art used for these rejections is as follows:

56. Sebastian, U.S. Patent 5,822,206. (Henceforth referred to as "**Sebastian**").

57. Pang et al., U.S. Patent 6,578,188. (Henceforth referred to as "**Pang**").

58. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

59. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sebastian in view of Pang et al.

60. In regards to Claim 4, Sebastian does not expressly teach the following limitations:

> *4. The method of claim 3, wherein said measurement comprises performing at least one of digital radiography and optical scanning.*

Pang, on the other hand, expressly teaches (see col.1, lines 22-62. Emphasis added):

> In designing an integrated circuit (IC), engineers typically rely upon computer simulation tools to help create a circuit schematic design consisting of individual devices coupled together to perform a certain function. To actually fabricate this circuit in a semiconductor substrate the circuit must be translated into a physical representation, or layout, which itself can then be transferred onto a template (i.e., mask), and then to the silicon surface. **Again, computer aided design (CAD) tools assist layout designers in the task of translating the discrete circuit elements into shapes which will embody the devices themselves in the completed IC.** These shapes make up the individual components of the circuit, such as gate electrodes, field oxidation regions, diffusion regions, metal interconnections, and so on.
>
> In transferring the layout to a physical template, a mask (usually. a quartz plate coated with chrome) is generally created for each layer of the integrated circuit design. **This is done by inputting the data representing the layout design for that layer into a device such, as an electron beam machine which writes the integrated circuit layout pattern into the mask material.** In less complicated and dense integrated circuits, each mask comprises the geometric shapes which represent the desired circuit pattern for its corresponding layer. **In more complicated and dense circuits in which the size of the circuit features approach the optical limits of the lithography process, the masks may also comprise optical proximity correction features such as serifs, hammerheads, bias and assist bars which are**

sublithographic, sized features designed to compensate for proximity effects. In other advanced circuit designs, phase shifting masks may be used to circumvent certain basic optical limitations of the process by enhancing the contrast of the optical lithography process.

Examiner finds that the claimed "digital radiograph" corresponds to Pang's "lithography", and the claimed "optical scanning" corresponds to Pang's "optical proximity correction."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sebastian's teachings with those of Pang, because Pang expressly teaches the use of "computer aided design (CAD) tools" (see Pang, col.1, lines 29-32).

Conclusion

61. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

62. U.S. Patent 6,785,641 to Huang. The reference teaches methods for simulating the dynamic response of a drilling tool assembly, methods for optimizing a drilling tool assembly design, and methods for optimizing the drilling performance of a drilling tool assembly. See Figs. 9 and 7A and 7B.

63. U.S. Patent 6,233,538 to Gupta. The reference pertains to the field of manufacturing, and to the production of components such as sheet metal components. See col.1, lines 15-56.

64. Jones, S. "Modern Manufacturing Methods." 3rd Int'l Conf. on Factory, 2000. July 29, 1992. pp.136-144. Provides a general overview of current manufacturing methods and processes.

65. Srinivasan, V. "Issues in Conditional Tolerances for CAD Systems." 1985 IEEE Int'l Conf. on Robotics and Automation. Mar. 1985. pp.373-375. The "Conditional Tolerences" correspond to the claimed "geometric dimensions and tolerances (GD&T)."

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749.

Any response to this office action should be faxed to (571) 273- 8300, or mailed to:

USPTO
P.O. Box 1450
Alexandria, VA 22313-1450

or hand carried to:

USPTO
Customer Service Window
Randolph Building
401 Dulany Street

Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon

Art Unit 2123

August 26, 2005

Paul L. Rodriguez 8/31/05

Primary Examiner
Art Unit 2125